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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,712	10/22/2003	Howard E. Rhodes	M4065.0660/P660	4640

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EXAMINER	
FENTY, JESSE A	

ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 05/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/689,712	RHODES ET AL.	
	Examiner	Art Unit	
	Jesse A. Fenty	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-28,54-59 and 61-82* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *78-82* is/are allowed.

6)☒ Claim(s) *1-6,8,21-28,54-59, 61 and 74-77* is/are rejected.

7)☒ Claim(s) *9-20 and 62-73* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 02/23/06 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4 and 57 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 4 and 57 recite the limitation "the other portions of the implant" in lines 2 and 3 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4, 5, 21-25 and 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Park et al. (US 2004/0046193 A1).

In re claim 1, Park (e.g. Figs. 5, 8) discloses an image pixel structure, comprising:

a semiconductor substrate (52) of a first conductivity type (P) having a surface;

a gate (64) over a surface of the substrate; and

a photodiode within said substrate, said photodiode including an implant region of a second conductivity type (N), a first portion (62) of said implant region having a lower boundary in said substrate and extending further towards a region of said substrate beneath said gate than a second portion (58) of said implant region extends towards said region beneath said gate,

wherein said second portion is adjacent to and substantially underneath said first portion such that said lower boundary of said first portion forms an upper boundary for at least a part of said second portion.

In re claim 2, Park discloses the device of claim 1, wherein the substrate is p-type and the implants are N-type.

In re claim 4, as best understood, Park discloses the device of claim 1, wherein an upper portion of said implant region is farther away from the region beneath said gate than the other portions of the implant.

In re claim 5, Park discloses the device of claim 1, wherein said first portion is nearest the substrate surface in the implant region.

In re claim 21, Park discloses the device of claim 1. The limitation, "wherein at least one of said portions of said implant region is angled" are process limitations. The presence of process limitations on product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to the product. In re Stephens 145 USPQ 656 (CCPA 1965).

In re claim 22, Park discloses the device of claim 1. The limitation specifying that the device will be used as a "CCD imager" is a recitation of the intended use of the device. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex Parte Masham, 2 USPQ F.2d 1647 (1987). Therefore, the structure disclosed by Park satisfies the structural limitations of the claim.

In re claim 23, Park discloses the device of claim 1, wherein the image pixel structure is a CMOS imager.

In re claim 24, Park discloses the device of claim 23, wherein said image pixel structure is one of a four transistor (Fig. 1) structure.

In re claim 25, Park discloses the device of claim 1, wherein the gate includes a gate oxide and a conductor.

In re claim 27, Park discloses the device of claim 25, wherein said gate includes an insulator over the conductor.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3, 6, 8, 26 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park (as above).

In re claim 3, Park discloses the claimed invention except for specifying that the photodiode could work with a reversal of material conductivity types. It would have been obvious to one having ordinary skill in the art at the time the invention was made to reverse N type for P type and P type for N type, since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. In re Einstein, 8 USPQ 167.

In re claims 6 and 8, Park discloses the device of claim 5, but does not expressly disclose the implant dose being between 2E11 – 2E13/square cm. It would have been

obvious to one having ordinary skill in the art at the time the invention was made to dope the upper diode area at the claimed concentration, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F. 2c 272, 205 USPQ 215 (CCPA 1980).

In re claim 26, Park discloses the device of claim 25, but does not expressly disclose the material for the gate layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use any of the claimed materials since it was well known in the art at the time of the invention to use polysilicon, metal, or polycide layers as conductors for use as gate layers.

In re claim 28, Park discloses the device of claim 27, but does not expressly disclose the material for the insulator. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use any of the claimed materials since it was well known in the art at the time of the invention to use oxides, nitrides, or combinations thereof for use as insulator layers for the purpose, for example, of insulating layer conductive layers from upper metallization connections and external signals.

Claims 54-59, 61 and 74-77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park (as above) in view of Nagata et al. (U.S. Patent No. 6,407,417).

In re claim 54, Park (e.g. Figs. 5, 8) discloses an image pixel structure, comprising:

a semiconductor substrate (52) of a first conductivity type (P) having a surface;

a gate (64) over a surface of the substrate; and

a photodiode within said substrate, said photodiode including an implant region of a second conductivity type (N), a first portion (62) of said implant region which extends further towards a region of said substrate beneath said gate than a second portion (58) of said implant region;

wherein said second portion is adjacent to and substantially underneath said first portion such that a portion of a lower boundary of said first portion forms an upper boundary for said second portion.

Nakamura does not expressly disclose the CMOS imaging device also

comprising a processor. Nagata (esp. Fig. 13) discloses a photoelectric conversion device similar to that of Nakamura that makes use of a processor. It would have been obvious to one skilled in the art at the time of the invention to use a processor as disclosed by Nagata for the device of Nakamura for the purpose, for example, of better controlling the various modes of operation of the device.

In re claim 55, Park in view of Nagata discloses the device of claim 54, wherein the substrate is p-type and the implants are N-type.

In re claim 56, Park in view of Nagata discloses the claimed invention except for specifying that the photodiode could work with a reversal of material conductivity types. It would have been obvious to one having ordinary skill in the art at the time the invention was made to reverse N type for P type and P type for N type, since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. In re Einstein, 8 USPQ 167.

In re claim 57, as best understood, Park in view of Nagata discloses the device of claim 54, wherein an upper portion of said implant region is farther away from the region beneath said gate than the other portions of the implant.

In re claim 58, Park in view of Nagata discloses the device of claim 54, wherein said first portion is nearest the substrate surface in the implant region.

In re claims 59 and 61, Park in view of Nagata discloses the device of claim 54, but does not expressly disclose the implant dose being between 2E11 – 2E13/square cm. It would have been obvious to one having ordinary skill in the art at the time the invention was made to dope the upper diode area at the claimed concentration, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F. 2c 272, 205 USPQ 215 (CCPA 1980).

In re claim 74, Park in view of Nagata discloses the device of claim 54. The limitation, "wherein at least one of said portions of said implant region is angled" are process limitations. The presence of process limitations on product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to the product. In re Stephens 145 USPQ 656 (CCPA 1965).

In re claim 75, Park in view of Nagata discloses the device of claim 54. The limitation specifying that the device will be used as a "CCD imager" is a recitation of the intended use of the device. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

Ex Parte Masham, 2 USPQ F.2d 1647 (1987). Therefore, the structure disclosed by Park satisfies the structural limitations of the claim.

In re claim 76, Park in view of Nagata discloses the device of claim 54, wherein the image pixel structure is a CMOS imager.

In re claim 77, Park in view of Nagata discloses the device of claim 76, wherein said image pixel structure is one of a four transistor (Fig. 1) structure.

Allowable Subject Matter

Claims 9-20 and 62-73 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 78-82 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: The dependent claims 9 and 62, as well as independent claim 78, that disclose at least a implant region comprising a third portion, said third portion being underneath the second portion in the implant region is neither anticipated nor obvious over the prior art of record.

Response to Arguments

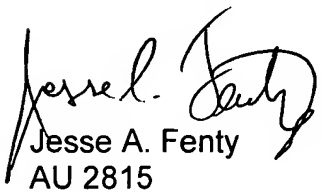
Applicant's arguments with respect to the previously rejected claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse A. Fenty whose telephone number is 571-272-1729. The examiner can normally be reached on M-F 5/4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jesse A. Fenty
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